RINGKASAN

Mulsa plastik umumnya digunakan dalam kegiatan pertanian untuk mengurangi laju evaporasi, menjaga kestabilan suhu dan kelembaban tanah, menurunkan laju erosi dan menekan pertumbuhan gulma. Namun, penggunaan mulsa ini seringkali dihadapkan pada permasalahan pencemaran lingkungan karena plastik yang sulit terdegradasi. Teknologi biomulsa lembar menjadi salah satu alternatif solusi atas permasalahan di atas, dan telah mulai dikembangkan dengan bahan dasar seperti serabut kelapa, serbuk gergaji dan lain-lain. Keunggulan biomulsa ini selain memiliki sifat dan fungsi yang menyerupai mulsa plastik, bahannya mudah terdegradasi sehingga tidak mencemari lingkungan. Namun, bahan tersebut bersaing dengan keperluan lainnya, sehingga diperlukan bahan lain seperti jerami dan alang-alang yang ketersediaannya sangat melimpah. Penelitian ini bertujuan untuk: 1) Mengetahui perfomansi sifat fisik-mekanik biomulsa, 2) Mengetahui pengaruhnya terhadap sifat fisik-biologi tanah (evaporasi dan pertumbuhan gulma).

Penelitian dilaksanakan di Laboratorium Teknik Pengendalian Bio-Lingkungan, Fakultas Pertanian, Universitas Jenderal Soedirman, sedangkan untuk uji performansi dilakukan di Laboratorium Daya dan Mesin Pertanian, dan Laboratorium Fisika Tanah, Universitas Brawijaya. Rancangan percobaan meliputi kombinasi perlakuan jerami (J) atau alang-alang (A) dengan eceng gondok (1/2/3/4). Komposisi yang digunakan adalah 20%+80% (J1 dan A1), 50%+50% (J2 dan A2), 60%+40% (J3 dan A3) serta 90%+10% (J4 dan A4). Variabel yang diamati adalah rendemen, tebal, jumlah lubang, uji tarik, uji tekan, daya serap air, ketahanan air, evaporasi dan daya tembus gulma. Sampel yang diperoleh diuji laboratorium dan uji F kemudian dilanjutkan dengan DMRT dengan taraf 5%.

Hasil penelitian menunjukkan adanya variasi rendemen yang dihasilkan, dimana rendemen terendah pada J1 (15,87%) dan tertinggi pada A4 (75,63%). Jumlah lubang biomulsa untuk J1 dan A1 adalah 1 lubang/cm^2. Ketebalan biomulsa tertinggi adalah A4 (4,02 mm) dan terendah pada J1 (1,13 mm). Kuat tarik biomulsa tertinggi adalah A4 (0,083 kg/cm^2), dan terendah adalah A1 (0,0056 kg/cm^2). Kuat tekan biomulsa tertinggi adalah A4 (5,56 kg/cm^2), dan terendah pada J2 dan J1 (1,59 kg/cm^2). Kemampuan biomulsa untuk menyerap air tertinggi pada A1 (6,66 ml air/g biomulsa), dan terendah pada A3 (3,96 ml air/g biomulsa). J1, J2, A1 dan A2 belum dapat terdegradasi walaupun diberi hujan lebih dari 1.000 tetes. Evaporasi pada penggunaan biomulsa A4 memiliki rataan nilai evaporasi 1,48-1,5 mm dan mampu menurunkan laju penguapan sebesar 60-62%. Selain itu penggunaan biomulsa mampu menekan pertumbuhan gulma hingga 100%. Dapat disimpulkan bahwa biomulsa perlakuan A4 memiliki nilai kuat tarik dan tekan terbaik sebesar 0,083 kg/cm^2 dan 5,56 kg/cm^2, sedangkan untuk kemampuan menyerap air tertinggi adalah biomulsa dengan perlakuan A1 sebesar 6,66 ml air/g biomulsa.

SUMMARY

Plastic mulch is generally used in agricultural activities to reduce the rate of evaporation, keeping the stability of temperature and soil moisture, reduce the rate of erosion and suppress weed growth. However, the use of mulch is often faced with the difficulty of the degraded plastic so that it pollutes the environment. Technology of biomulch sheets made from natural fibers such as coconut and sawdust can be one solution to the problem of environmental pollution. Biomulch has the advantage of easily degraded, also has properties and functions that resemble plastic mulch. However, the necessary materials such as straw and reeds are abundant as well as its availability does not compete with other purposes. This research aims to: 1) Knowing the performance of mechanical-physical properties of Biomulch Sheet, 2) knowing the influence of biomulch sheet against physical-biological properties of the soil (evaporation and weed growth).

Research conducted at the Laboratory of Bio-Environmental Control Engineering, Faculty of Agriculture, University of Jenderal Soedirman, while for the performance test conducted at the Laboratory of Power and Agricultural Engineering and Soil Physics Laboratory, University of Brawijaya. The experimental design includes a combination treatment of paddy straw (J) or grass reed (A) with water hyacinth (1/2/3/4). The composition used was 20% + 80% (J1 and A1), 50% + 50% (J2 and A2), 60% + 40% (J3 and A3) and 90% + 10% (J4 and A4). The variables measured were yield, thickness, the number of holes, tensile test, compression test, water absorption, water resistance, evaporation and weed penetrating power. Samples obtained test laboratory tested and then continued with Duncan Multiple F with a level of 5%. The results showed the yield variation is generated, where the lowest yield on J1 (15.87%) and highest in A4 (75.63%). A Number of holes sheet mulch for J1 and A1 is 1 hole/cm^2. The highest sheet mulch thickness is A4 (4.02 mm) and the lowest in the J1 (1.13 mm). The highest tensile strength sheet mulch is A4 (0.083 kg/cm^2), and the lowest is the A1 (0.0056 kg/cm^2). Sheet mulch highest compressive strength is A4 (5.56 kg/cm2), and the lowest in the J2 and J1 (1.59 kg/cm^2). Sheet mulch ability to absorb high water on the A1 (6.66 ml water/g sheet mulch), and the lowest on the A3 (3.96 ml water/g sheet mulch). J1, J2, A1, and A2 can not be degraded even if given more than 1,000 drops of rain. Evaporation at sheet mulch use A4 has the average value of evaporation from 1.48 to 1.5 mm and is able to lower the evaporation rate of 60-62%. In addition, the used sheet mulch able to suppress the growth of weeds up to 100%. It was concluded that treatment sheet mulch A4 has a tensile strength value and the best hit of 0.083 kg/cm^2 and 5.56 kg/cm^2, while for the highest capacity to absorb water is sheet mulch with treatment A1 amounted to 6.66 ml water/g sheet mulch.